K.R. Mangalam University
School of Engineering & Technology

AI & ML CAREER PATHWAYS REPORT

Course Code: ETCCCP105
Course Name: Computer Science Fundamentals & Career Pathways
Programme: B.Tech CSE (Specialization in AI & ML)
Semester: 1

Assignment No.: 03
Domain: Artificial Intelligence and Machine Learning (AI/ML)
Aim: To explore opportunities, applications, and career pathways in AI/ML.

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1. DOMAIN OVERVIEW

Artificial Intelligence (AI) and Machine Learning (ML) are subfields of computer science that enable computers to learn from data and make intelligent decisions.
AI aims to create systems capable of performing tasks that normally require human intelligence, while ML focuses on enabling systems to learn and improve through experience.

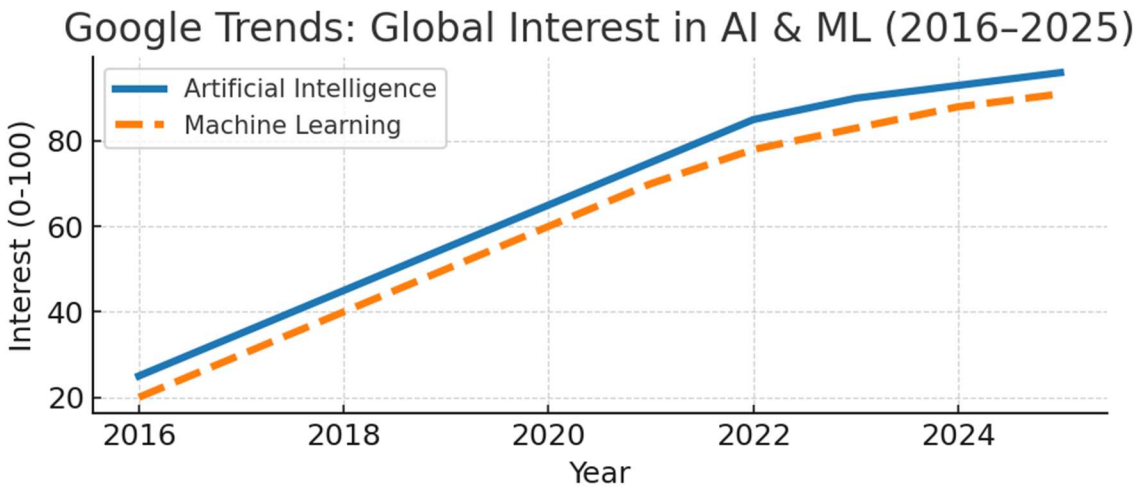
From virtual assistants and self-driving cars to recommendation systems and language models like ChatGPT, AI/ML is shaping the future of every industry.
The global AI market is projected to reach $500 billion by 2027, driven by automation, research, and innovation across all sectors.

2. WHY THIS FIELD IS SPECIAL

a. Combines computer science, mathematics, and creativity to solve real-world problems.
b. Powers modern innovations — from autonomous robots to AI-powered healthcare.
c. Offers high-paying jobs and continuous learning opportunities.
d. Promotes innovation and allows contribution to technology that changes lives.

3. CURRENT TRENDS IN AI & ML

1. Generative AI: Tools like ChatGPT, Gemini, and Midjourney are transforming content creation and automation.
2. AI in Healthcare: AI assists in diagnostics, predictive analytics, and robotic surgeries.
3. Edge AI: Bringing AI computation to devices like smartphones and IoT systems for faster decision-making.
4. Ethical AI: Growing emphasis on transparency, privacy, and fairness in AI applications.
5. AI in Education: Adaptive learning systems provide personalized education experiences.



Both AI and ML have witnessed rapid global growth in interest, especially after 2020, reflecting increasing adoption and research focus worldwide.

4. KEY JOB ROLES IN AI & ML

• Machine Learning Engineer – Builds ML algorithms for predictive and analytical tasks.
• AI Research Scientist – Develops new algorithms and explores advanced AI models.
• Data Scientist – Analyzes data patterns and derives insights for decision-making.
• MLOps Engineer – Handles deployment and monitoring of ML models in production.
• AI Developer – Integrates AI tools into applications and services.

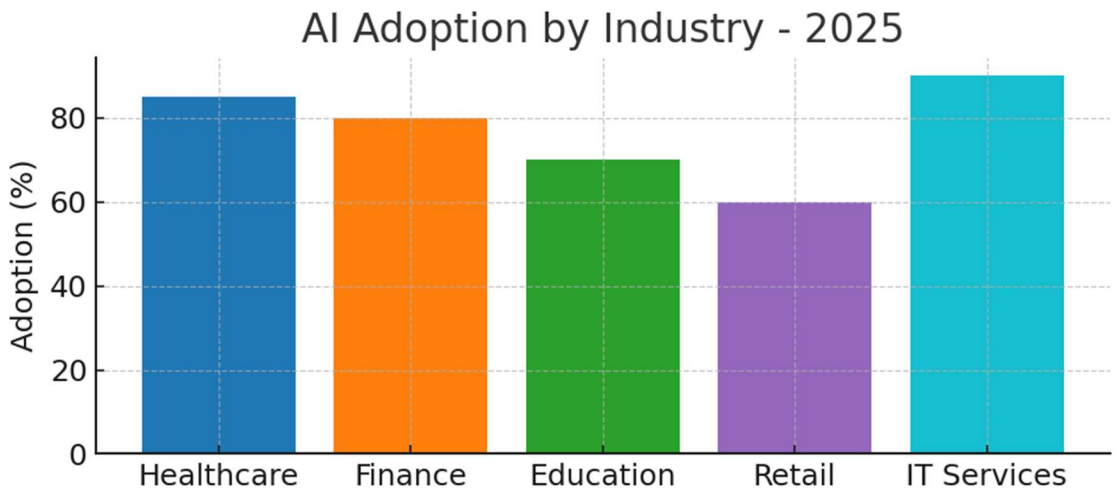
5. WHY I CHOSE THIS DOMAIN AS MY CAREER

I chose AI/ML because it excites my curiosity and passion for problem-solving. The potential of machines to learn, think, and make decisions like humans fascinates me.
AI is not just about technology; it's about creating intelligent systems that can improve people's lives.
Moreover, AI/ML provides a rewarding career with

continuous innovation and global demand. **3. CURRENT TRENDS IN AI & ML**

6. COMPARISONS BETWEEN DOMAINS

a. AI/ML interest in India has grown exponentially since 2018, surpassing traditional domains like web or app development.
b. Worldwide, AI/ML remains among the top 3 career choices in the tech sector.
c. AI/ML engineers in India earn an average salary of ₹10–15 LPA (2025), while globally it can exceed $120,000 annually.



AI adoption is highest in IT Services and Healthcare, followed closely by Finance, showing how AI impacts critical industries globally.

7. MINIMUM REQUIRED TOOLS & SKILLS

Programming: Python, R, C++
Frameworks: TensorFlow, PyTorch, Keras, Scikit-learn
Data Tools: Pandas, NumPy, SQL
Mathematics: Statistics, Probability, Linear Algebra
MLOps Tools: Docker, MLflow, Git, Kubernetes
Cloud Platforms: AWS, Google Cloud, Azure

FLOWCHART: HOW AI/ML WORKS

This flowchart represents the step-by-step process in a typical AI/ML system pipeline.

REAL-WORLD APPLICATION

Project Title: Smart Crop Disease Detection System
Objective: Use AI and ML to identify plant diseases from leaf images and recommend solutions.
Tools: Python, TensorFlow, OpenCV, Google Cloud Vision
Impact: Helps farmers prevent large-scale crop loss by early detection of infections.

ROADMAP TO BECOME AN AI/ML ENGINEER

Year 1: Learn Python, basic ML, and mathematics fundamentals.
Year 2: Master ML frameworks, build intermediate projects, explore MLOps.
Next 6 Months: Create a portfolio, apply for internships, and gain certification (AWS, Google, IBM AI).

CONCLUSION

AI/ML represents the future of computing and automation. With continuous learning and innovation, one can build a rewarding career in this field.

The combination of data, logic, and creativity makes AI/ML a domain full of endless possibilities.

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